GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Fundamentals of Control, PG_00056914		
Field of study	Electrical Engineering		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	first-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	4	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Controlled Electric Drives -> Faculty of Electrical and Control Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Arkadiusz Lewicki	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	30.0	0.0	0.0	0.0	60

E-learning hours included: 0.0

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	60	5.0	35.0	100

Subject objectives

Providing knowledge of the basics of automation, in particular knowledge covering linear control systems, methods of their description, analysis and synthesis

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_U07	The student is able to select a control system and analyze its behavior	[SU4] Assessment of ability to use methods and tools
K6_W08	The student knows the concept of a control system and knows the properties of the basic elements of automation. Can check the stability. Knows the basic designs of regulators	[SW1] Assessment of factual knowledge

Subject contents

Types of control systems,Basic diagram of the automatic control system,Practical examples of various automatic control systems,Definition of a linear system and a nonlinear system.Laplace transform, the concept of transmittanceTypes of signals: unit step, Dirac function, sinusoidally variable signal,Transforming block diagrams described using transfer functions, transferring the hitch and sum nodes,Description of the basic elements of the automatic control system, types of characteristics: phase and phase amplitude characteristics, logarithmic characteristics, Bode plots,Stability of linear automatic control systems: a. definition of stability, asymptotic and exponential, Approximation of a nonlinear system at the operating point, examples, Lyapunov's first law of stability,Stability criteria: algebraic, graphical and graphical-analytical with examples.Quality of automatic control systems: a. definition of error coefficients and method of their determination, error in the steady state, integral criteria of control qualityStatic and astatic systems, regulation time and overshoot, Module reserve and phase reserve,Regulators: a. various types of regulators and their characteristics, definition of basic regulator settings, methods of selecting regulator settings.Hysteresis and two-position control

Prerequisites and co-requisites

Knowledge of mathematics and basic electrical engineering.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Students' own studies on the subject	60.0%	50.0%
	Colloquia during classes	60.0%	50.0%
Recommended reading	Basic literature	M. Żelazny: Podstawy automatyki, PWN, 1976. M. Ferenc: Podstawy automatyki, Wydaw. Politechniki Opolskiej, 200 A.Urbaniak: Podstawy automatyki, Wyd. Politechniki Poznańskiej, Poznań, 2001 H. Bishop: Modern control systems, Dorf R.C., Addison-Wesley Publ. Co., 1995 Kowal: Podstawy automatyki, Uczelniane Wydawnictwa Naukowo-Dydaktyczne AGH Markowski, J. Kostro, A. Lewandowski: Automatyka w pytaniach i odpowiedziach, WNT Rumatowski: Podstawy Automatyki, Wydawnictwo Politechniki Poznańskiej 2004 Greblicki: Podstawy Automatyki Oficyna Politechniki Wrocławskiej 2006 Horla: Podstawy Automatyki. Ćwiczenia rachunkowe cz. I i II, Wydawnictwo P. Poznańskiej 2004 Kaczorek, A.Dzieliński, W. Dąbrowski, R. Łopatka: Podstawy Teorii Sterowania, WNT 2007	
	Supplementary literature	P. De Larminat, Yves Thomas, Automatyka układy liniowe, tom 1, Sygnały i układy, Wydawnictwa Naukowo - Techniczne, 1983 W. Findeisen, Technika regulacji automatycznej, PWN, 1965 T. Kaczorek, Teoria układów regulacji automatycznej, Wydawnictwa Naukowo ? T	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Test the stability of the systemDetermine the stability marginDetermine the equivalent transmittance of the system		
Work placement	Not applicable		